30-Day Launch Forecast

27 July 2000

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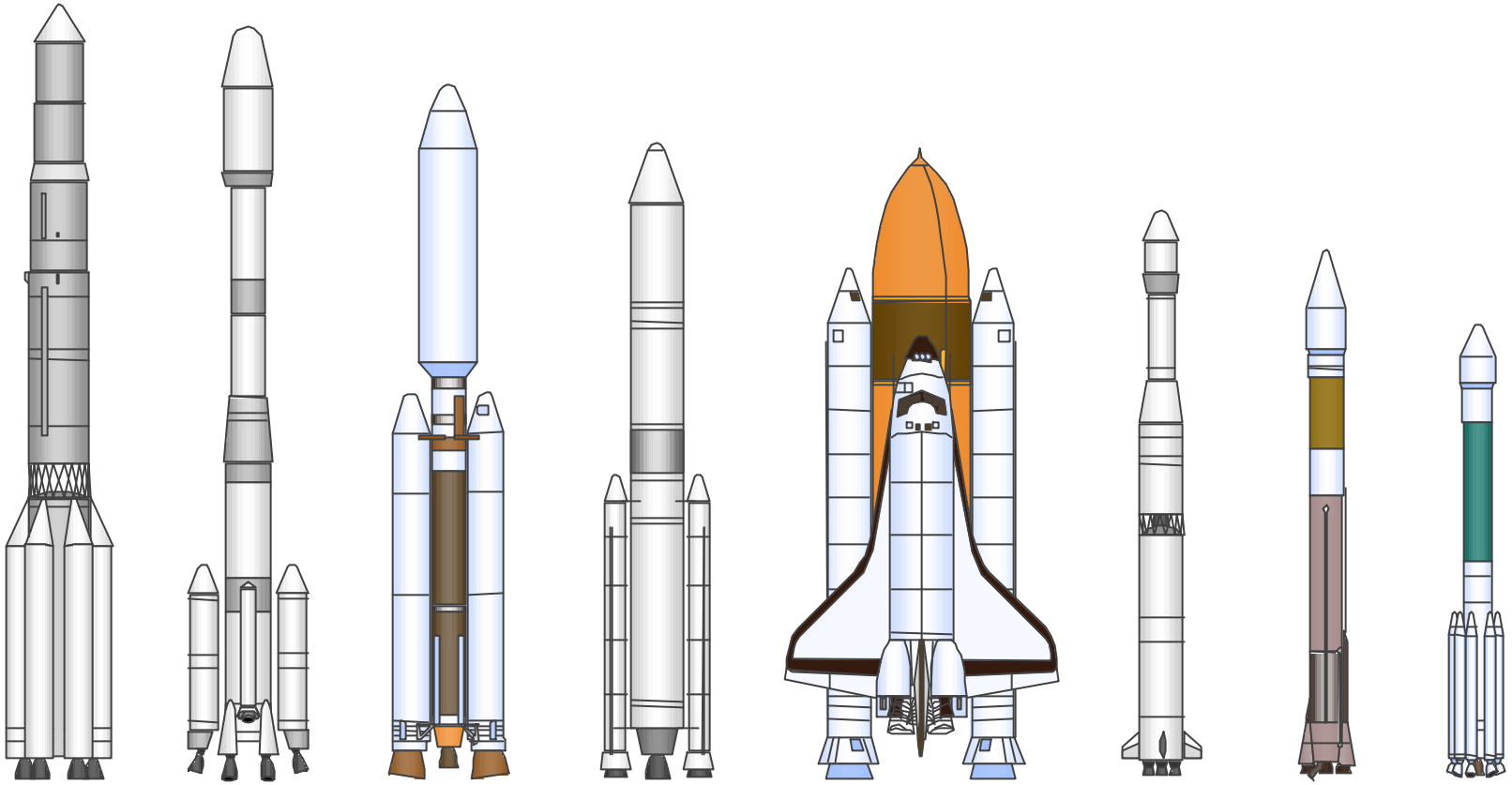


30-Day Launch Forecast
(27 July 2000 - 25 August 2000)

Mon	Tue	Wed	Thu	Fri	Sat	Sun	Comments / Schedule Changes
A Look Ahead 08 Sep STS-106 ISS 2A.2b 14 Sep Titan 2 NOAA-L 18 Sep Sea Launch Thuraya-1A 21 Sep Soyuz-U Progress M1 24 Sep Zenit 2 Badr-2 28 Sep Minuteman III GT-173-GM 30 Sep Proton LMI-4 All foreign launches presented in this forecast are unofficial			27	28 Sea Launch PAS-9 Launch Platform 1842 EDT	29	30	Sea Launch / PAS-9 • PanAmSat DTH communications satellite Soyuz-U / Progress M1-3 • Resupply for ISS Soyuz-Fregat / Cluster II • Second pair of four identically instrumented science satellites sponsored by ESA
31	1 Aug	2	3	4	5	6  Soyuz-U Progress M1 Baikonur TBD EDT	Titan 4B / NRO; Mission B-28 • Classified military satellite • No Upper Stage (NUS/403 configuration) • Launch date is expected to be delayed to 16 Aug due to satellite problems, but no new date has been officially set
7	8	9  Soyuz-Fregat Cluster II Baikonur 1102 EDT	10  Titan 4B NRO SLC-4E VAFB 2200-0200 EDT	11	12	13	Ariane 44LP / Brasilsat B-4 / Nilesat 102; Flight 131 • Brasilsat B-4: Brazilian communications satellite • Nilesat 102: Egyptian communications satellite Delta 3 / DM-F3; Flight 280 • Demonstration flight with dummy payload to prove vehicle flightworthiness
14	15	16	17  Ariane 44LP Brasilsat B-4 Nilesat 102 ELA-2 CSG TBD EST	18	19	20	Dnepr / Saudisat 1-A &1-B / UNISAT / Megsat 1 / TiungSat 1 • Saudisat: Saudi Institute for Space Research • UNISAT: University of Rome microsatellite • Megsat 1: Italian data relay satellite • TiungSat 1: Malaysian remote sensing payload
21	22	23  Delta 3 DM-F3 SLC-17B CCAFS 0900-1300 EDT	24	25 Dnepr Saudisat 1-A & 1-B Baikonur TBD EDT	**Last Week's Launch Activities** Date Vehicle Payload Site Type No Launch Activities Last Week Launch Date provided in Universal Time		

Acronyms:
VAFB - Vandenberg AFB CA; SLC - Space Launch Complex
CCAFS - Cape Canaveral AFS FL; LC- Launch Complex
KSC - Kennedy Space Center FL; LF - Launch Facility
CSLF - Calif. Space Launch Facility; EDT - Eastern Daylight Time
NET - No Earlier Than; EST - Eastern Standard Time
WFF - Wallops Flight Facility; CSG - Guiana Space Center

Sea Launch

Current Mission Specifics

4th launch of the Sea Launch Vehicle

Reliability History

- **2 successes in 3 attempts**

Typical Launch Sequence

• Liftoff	0 sec
• Stage 2 vernier ignition	141 sec
• Stage 1/2 separation	146 sec
• Stage 2 main engine ignition	152 sec
• PLF jettison	211 sec
• Stage 2 shutdown	445 sec
• Stage 2/3 separation	546 sec
• Upper Stage ignition	556 sec
• Upper Stage shutdown	1,198 sec
• Payload separation	1,698 sec

Payload weight: PAS-9; 8,046 lb (at launch)

Orbit: Geostationary at 58° West (replaces PAS-5)

Next Sea Launch launch:

- **18 September 2000 / Thuraya-1A**

Background Information

First Launch:	**March 1999**
Flight Rate:	**6-8 launches per year (projected)**
Launch Site:	**Pacific Ocean Equator at 154° W longitude**
Capability:	**4,630 lb to GEO; 11,000 lb to GTO; 26,450 lb to 108 nm Polar orbit**

History

- **Boeing Commercial Space Co. (U.S.), RSC Energia (Russia), NPO Yuzhnoye (Ukraine), and Kvaerner Group (Norway) form Sea Launch partnership in April 1995.**
- **Construction of Sea Launch Home Port facilities in Long Beach, CA begun in August 1996 and completed in January 1998.**
- **Completed sea trials of command ship and *Odyssey* launch platform in March 1999.**

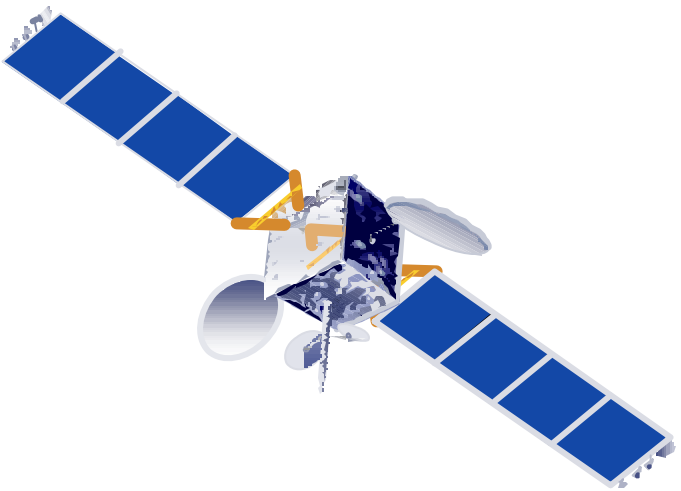
Description

- **Three-stage Zenit 3SL rocket system produced by NPO Yuzhnoye in Ukraine.**
- **Stage 1 powered by an RD-171 engine (single turbopump feeding four thrust chambers) burning LOX/kerosene and generating 1,626,335 lb of thrust.**
- **Stage 2 uses an RD-120 engine with a single thrust chamber plus an RD-8 vernier with four thrust chambers and produces 205,250 lb of total vacuum thrust.**
- **Utilizes an RSC Energia Block DM-SL restartable upper stage powered by an 11D58M engine operating on LOX/kerosene and producing 17,635 lb of thrust.**
- **660 ft long Command ship provides crew accommodations for up to 240 personnel and mission control, communications, and processing facilities for launch of spacecraft.**
- ***Odyssey* launch platform is a 68,000,000 lb self-propelled, semi-submersible launch complex for transporting and launching the vehicle.**

Profile

Length:	**195.5 ft**	**Launch Weight:**	**1,036,160 lb**
Diameter:	**12.8 ft**	**Liftoff Thrust:**	**1,626,335 lb**
Payload Fairing:	**37.4 x 13.6 ft**		

PAS-9



Spacecraft Specifications

Weight:

- **8,046 lb (at launch)**
- **5,238 lb (BOL)**

Dimensions:

- **Main Body: 13.1 x 8.6 x 11.8 ft**
- **Solar Arrays: 85.3 ft**

PanAmSat 9

PanAmSat Corporation, based in Greenwich, Conn., has the world's largest commercial geostationary satellite network. The company builds, owns and operates networks that deliver entertainment and information to cable television systems, TV broadcast affiliates, direct-to-home TV operators, Internet service providers, telecommunications companies and corporations.

Mission

Provide DTH TV global video and data broadcasting services to the Americas, the Caribbean, and western Europe.

Description

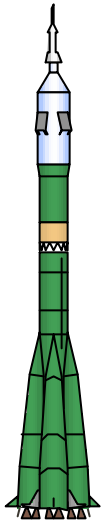
Spacecraft Description:

- **Hughes HS-601HP (High Power) body-stabilized bus.**
- **24 active 55 W TWTAs; 5.925-6.425/3.700-4.200 GHz up/down C-band beams; 36 MHz bandwidth; orthogonal linear polarization.**
- **24 active 108 W TWTAs; 14.00-14.50/11.45-12.20 GHz up/down Ku-band beams; 36 MHz bandwidth; orthogonal linear polarization.**
- **Xenon ion propulsion system (XIPS).**
- **Power: Twin 4-panel, dual-junction GaAs solar panels provide 9.9 kW (BOL); 30-cell 350-Ah NiH battery for eclipse protection.**
- **Design life: 15 years.**

Orbit: Geostationary at 58° West (replaces PAS-5)

Prime Contractor: Hughes Space and Communications Co.

Soyuz-U



Current Mission Specifics

551st launch of a Soyuz Launch Vehicle since 1980

Reliability History (since 1980)

- **537 successes in 550 attempts**

Typical Launch Sequence

• Lift off	0 sec
• Strap-ons separate	118 sec
• Payload fairing jettison	160 sec
• Core stage 1 separation	286 sec
• Orbit Injection	540 sec

Payload Weight: Progress M1; 16,095 lb (at launch)

Orbit: 210 nm circular, 51.6° inclination

Next Soyuz launch

- **9 August 2000 / Cluster II**

Background Information

First Launch:	**November 1963**
Flight Rate:	**45 per year (maximum recorded launch rate)**
Launch Site:	**Plesetsk, Russia; Baikonur, Kazakhstan**
Capability:	**15,400 lb to LEO**

History

- **Developed from the Vostok Launch Vehicle originally derived from the SS-6 (Sapwood) ICBM.**
- **Used to launch every former Soviet Union piloted spacecraft since 1964.**
- **Also used to launch photo reconnaissance satellites, earth resource satellites, and Progress resupply missions to the Mir space station.**

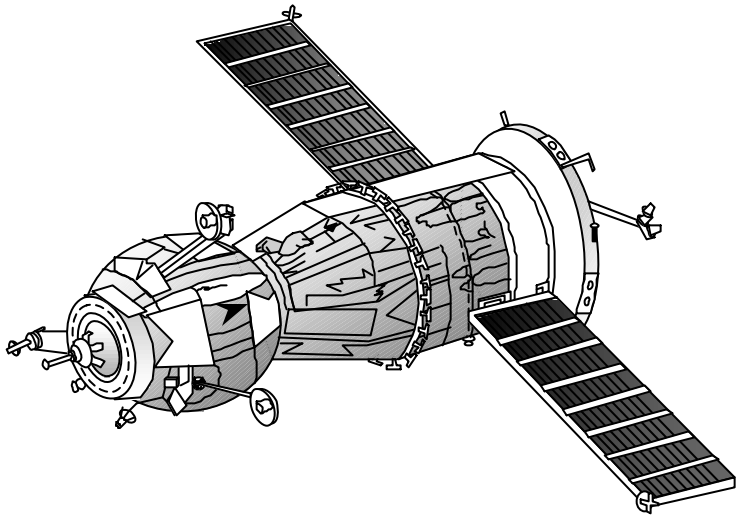
Description

- **Two-stage (plus 4 strap-ons) liquid fueled vehicle.**
- **Stage 1 core has one RD-108 booster engine (one turbopump with four separate combustion chambers) burning LOX/kerosene fed from stage 1 tanks, generating 220,050 lb of thrust.**
- **Four Stage 1 strap-ons each have one RD-107 engine (one turbopump with four separate combustion chambers) burning LOX/kerosene fed from stage 1 tank, generating a total of 227,925 lb of thrust each.**
- **Stage 2 has one RD-0110 Block 1 engine burning LOX/kerosene, generating 67,050 lb of thrust.**
- **Starsem version only: Fregat restartable upper stage powered by a single-chamber Lavochkin engine engine burning UDMH/N_2O_4, generating 4,410 lb of vacuum thrust.**

Profile

Length:	**162.5 ft**	**Launch Weight:**	**682,765 lb**
Diameter:	**33.8 ft**	**Liftoff Thrust:**	**1,334,700 lb**
Payload Fairing:	**37.3 ft x 9.8 ft**		

Progress-M1



Spacecraft Specifications

Total Weight:

- **16,095 lb (at launch)**

Dimensions:

- **Total Length: 23.7 ft**
- **Diameter: 7.2 ft**
- **Solar Arrays: 107.6 ft^2**

Progress-M1

Unmanned Russian space station resupply ferry.

Mission

Deliver removable cargo such as experimental equipment, food, water, and air regeneration cylinders as well as propellants and compressed gases to the International Space Station (ISS).

Description

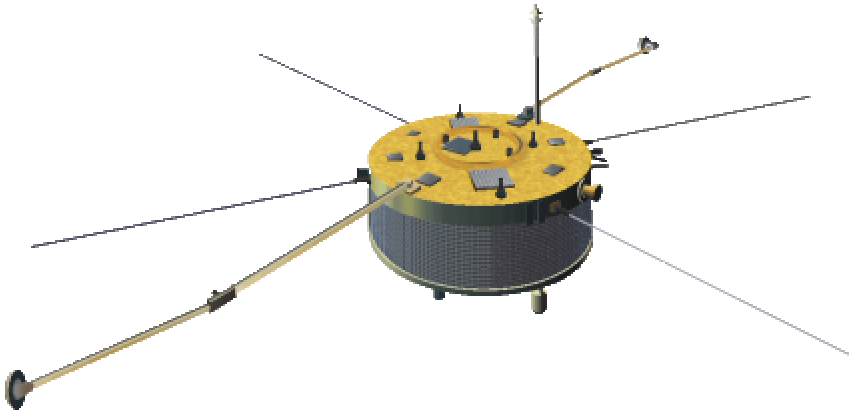
Spacecraft Description:

- **Crew-accessible cargo compartment; mid-section compartment for fuel components; aft section instrument assembly module.**
- **Carries 3,970 lb of consumables in cargo compartment and 2,072 lb of fuel in mid-section (UDMH/NTO and O_2).**
- **TM-type solar arrays generating 1.3 kW; batteries carried in pressurized instrument package augment Mir when docked.**
- **Docks with ISS employing Kurs ('course') approach system; station crew docking assist available.**
- **Navigation computations performed by mission control and uplinked for execution.**
- **Raduga coni-cylindrical re-entry capsule used to return film and experimental samples; separates during re-entry for parachute recovery.**
- **Design life: 1 time use only (destructive re-entry over Pacific Ocean).**

Orbit: 210 nm circular, 51.6° inclination

Prime Contractor: RKK Energia

Cluster II



Cluster II

Second pair of four identical satellites that will fly in formation. Cluster II is one of ESA's top priority Cornerstone science missions, and replaces the original Cluster mission that was destroyed during the failed maiden launch of the Ariane 5 rocket in June 1996.

Mission

Study the interaction between the the solar wind and the Earth's magnetosphere allowing for the first time truly three-dimensional measurements of both large- and small-scale phenomena in the near-Earth environment.

Description

Spacecraft Description:

- **Spin-stabilized cylindrical bus; orbit/attitude maintenance performed by semi-radial and axial control thrusters together with the main engine.**
- **Each satellite carries an identical set of 11 instruments mounted to the Main Equipment Platform.**
- **Power: 224 W provided by six curved solar-array panels; five 80 Ah Silver Cadmium batteries provide eclipse protection.**
- **Carries two 5 meter-long experiment booms, four 50 meter-long wire booms, and two antenna booms.**
- **Telemetry downlink bit rate 2 to 262 kbit/s.**
- **Design life: 2 years.**

Orbit: **Highly eccentric polar orbits ranging from 13,510 to 67,555 nm at 64.8° - 90° inclination**

Prime Contractor: Dornier

Spacecraft Specifications

Weight:

- **2,645 lb (at launch)**
- **1,213 lb (dry mass)**

Dimensions:

- **Height:** **4.3 ft**
- **Diameter:** **9.5 ft**

Space Launch Activities
2000 Year To Date

United States Launches

Date	Vehicle	Payload	Site	Type
18 Jan	Minuteman II	IFT-4	VAFB, LF-03	Missile Defense (MIL)
21 Jan	Atlas 2A	DSCS-B8	CCAFS, SLC-36A	Communications (MIL)
27 Jan	Minotaur	JAWSAT	VAFB, SLC-7	Technology Demo (MIL)
03 Feb	Atlas 2AS	Hispasat 1-C	CCAFS, SLC-36B	Communications (COM)
08 Feb	Delta 2	Globalstar-14	CCAFS, SLC-17B	Communications (COM)
11 Feb	STS-99	SRTM	KSC, LC-39A	Radar Mapping (CIV)
08 Mar	Peacekeeper	GT-29-PA	VAFB, LF-05	FOT&E (MIL)
12 Mar	Taurus	MTI	VAFB, 576-E	Technology Demo (MIL)
12 Mar*	Sea Launch	ICO F-1	Pacific Ocean	Communications (COM)
25 Mar	Delta 2	IMAGE	VAFB, SLC-2W	Science (CIV)
03 May	Atlas 2A	GOES-L	CCAFS, SLC-36A	Meteorology (CIV)
08 May	Titan 4B	DSP-20	CCAFS, SLC-40	Early Warning (MIL)
11 May	Delta 2	GPS IIR-4	CCAFS, SLC-17A	Navigation (MIL)
19 May	STS-101	ISS 2A.2a	KSC, LC-39A	ISS Resupply (CIV)
24 May	Minuteman III	FTM-02	VAFB, LF-09	Flight Test Missile (MIL)
24 May	Atlas 3A	Eutelsat-W4	CCAFS, SLC-36B	Communications (COM)
07 Jun	Pegasus XL	TSX-5	VAFB	Science (MIL)
09 Jun	Minuteman III	GT-172-GM	VAFB, LF-10	FOT&E (MIL)
30 Jun	Atlas 2A	TDRS-H	CCAFS, SLC-36A	Communications (CIV)
08 Jul	Minuteman II	IFT-5	VAFB, LF-03	Missile Defense (MIL)
14 Jul	Atlas 2AS	EchoStar-6	CCAFS, SLC-36B	Communications (COM)
16 Jul	Delta 2	GPS IIR-5	CCAFS, SLC-17A	Navigation (MIL)
19 Jul	Minotaur	MightySat II.1	VAFB, CSLF	Technology Demo (MIL)

French Launches

Date	Vehicle	Payload	Site	Type
25 Jan	Ariane 42L	Galaxy-10R	CSG, ELA-2	Communications (COM)
18 Feb	Ariane 44LP	SUPERBIRD-4	CSG, ELA-2	Communications (COM)
21 Mar	Ariane 505	INSAT-3B/ AsiaStar	CSG, ELA-3	Communications (COM) Communications (COM)
19 Apr	Ariane 42L	Galaxy 4-R	CSG, ELA-2	Communications (COM)

Chinese Launches

Date	Vehicle	Payload	Site	Type
25 Jan	LM 3A	Zhongxing-22	Xichang	Communications (CIV)
25 Jun	LM 3	Fengyun-2B	Xichang	Meteorological (CIV)

Indian Launches

Date	Vehicle	Payload	Site	Type
No Launches to Date				

Japanese Launches

Date	Vehicle	Payload	Site	Type
10 Feb*	M-5	ASTRO-E	Kagoshima	Science (CIV)

Brazilian Launches

Date	Vehicle	Payload	Site	Type
No Launches to Date				

* Indicates Launch Failure
Launch Date provided in Universal Time

Space Launch Activities
2000 Year To Date

Russian Launches

Date	Vehicle	Payload	Site	Type
01 Feb	Soyuz-U	Progress M1-1	Baikonur	Mir Resupply (CIV)
03 Feb	Zenit 2	Cosmos 2369	Baikonur	Signal Intelligence (MIL)
08 Feb	Soyuz-Fregat	IRDT	Baikonur	Technology Demo (COM)
12 Feb	Proton	Garuda-1	Baikonur	Communications (COM)
12 Mar	Proton	Express-6A	Baikonur	Communications (CIV)
20 Mar	Soyuz-Fregat	Dumsat	Baikonur	Technology Demo (COM)
04 Apr	Soyuz-U	Soyuz TM-30	Baikonur	Mir Resupply (CIV)
17 Apr	Proton	SESat	Baikonur	Communications (COM)
25 Apr	Soyuz-U	Progress M1-2	Baikonur	Mir Resupply (CIV)
03 May	Soyuz-U	Cosmos 2370	Baikonur	Classified (MIL)
16 May	Eurockot	SIMSAT-1 & -2	Plesetsk	Demo Flight (COM)
06 Jun	Proton	Gorizont-45	Baikonur	Communications (CIV)
24 Jun	Proton	Express-3A	Baikonur	Communications (CIV)
28 Jun	Kosmos 3M	Nadezhda/	Plesetsk	Navigation (CIV)
		Tsinghua-1/		Remote Sensing (CIV)
		SNAP-1		Technology Demo (CIV)
30 Jun	Proton	Sirius-1	Baikonur	Communications (COM)
04 Jul	Proton	Cosmos 2371	Baikonur	Data Relay (MIL)
12 Jul	Proton	Zvezda	Baikonur	ISS (CIV)
15 Jul	Kosmos 3M	CHAMP/	Plesetsk	Science (CIV)
		MITA/		Technology Demo (CIV)
		RUBIN		Science (CIV)
16 Jul	Soyuz-Fregat	Cluster II	Baikonur	Science (CIV)

Launch Market Analysis

By Country

	# of Launches	Percent of Market
US	12	33.3%
Russia	17	47.2%
France	4	11.1%
China	2	5.6%
Japan	1	2.8%

By Mission

	# of Launches	Percent of Market
US Military	4	11.1%
US Civil	3	8.3%
US Commercial	5	13.9%
World Military	3	8.3%
World Civil	11	30.6%
World Commercial	10	27.8%

By Orbit Type (Commercial Only)

GEO	# of Launches	Percent of Market
US	3	33.3%
Russia	2	22.2%
France	4	44.4%
China	0	0.0%
Japan	0	0.0%

LEO	# of Launches	Percent of Market
US	2	33.3%
Russia	4	66.7%
France	0	0.0%
China	0	0.0%
Japan	0	0.0%

Figures Do Not Include US Space Shuttle, Small Launch Vehicles, or ICBM launches

* Indicates Launch Failure
Launch Date provided in Universal Time